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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/511,934	02/24/2000	Hideaki Fukuda	ASMJP.032AUS	5598

7590 11/20/2002
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620 Newport Center Drive
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Newport Beach, CA 92660

EXAMINER

KACKAR, RAM N

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 11/20/2002

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/511,934

Applicant(s)

FUKUDA ET AL.

Examiner

Ram N Kackar

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 November 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel et al (US Patent 6019848) in view of Kao et al (US Patent 6125859).

Frankel discloses a susceptor with a heater (Fig 11) provided in a reaction chamber (Fig 1A- 200), conveyer for loading and unloading the wafers in to the reaction chamber (Col 25 line 1-3), cleaning device comprising a controller of gas (Fig 1D 153 and 163), vacuum controller (Fig 1D-165), a cleaning gas activator (Col 54 line 39 or Fig 1A 55), a program which instructs the controller to take the substrate out of the reaction chamber after processing and proceed with the chamber clean using activated cleaning gas (Fig 1D -157a and Col 54 line 8-29), evacuate the chamber after cleaning (Col 56 line 10-22), typical range of 500-800 C for deposition temperature (Col 53 line 38-41), cleaning gas being Fluorine (Col 9 line 13-15) and Fluorine radicals (Col 54 line 34), a plasma discharge region (Col 54 line 39), a remotely located plasma discharge chamber (Fig 1A -55), unwanted deposits like silicon oxide (Col 9 line 24-26), a plasma CVD apparatus (Col 2 line 31-34) and a shower head above the susceptor in the reaction chamber (Fig 5- 20).

Frankel et al do not disclose the step of inert gas flow and reduction of susceptor temperature prior to start of the cleaning gas activation.

Kao et al disclose introduction of inert gas prior to introduction of reactive cleaning gas (Abstract and Col 11 lines 53-60) and both Frankel and Kao disclose a preferred temperature range of pedestal during the cleaning process to be 400°-700° C (Kao- Col 17-lines 59-63 and Frankel- Col 54 lines 67 to Col 55 line 1).

There fore it would have been obvious to one having ordinary skill in the art at the time invention was made, to add the step of inert gas introduction for pressure stabilization and removal of particulates before introduction of reactive cleaning gas and the step of susceptor cooling to bring the temperature of the susceptor to recommended range (400-700 preferably 550) as per the teaching of Kao et al to the sequence of Frankel et al.

Response to Amendment

Applicants arguments filed on 11/04/2002 are considered but not found to be persuasive.

1 Applicant has argued that introduction of inert gas before the reactive gases is disclosed in Kao is for stabilizing the pressure for film processing and not for cleaning. This argument is not persuasive because Kao clearly states the introduction of inert gas is before reactive process. Secondly, it is not even necessary that it be for the same purpose as in the claim.

2 Applicant has argued that Kao teaches away from lowering the temperature for cleaning and quoted “ *the temperature need not be lowered to avoid over etching of the chamber's components*”. Kao has clearly indicated its preference for a cleaning temperature of 550° C. Frankel has disclosed the same, a range of (550° C -600° C). Kao has only stated that in the context of other cleaning parameters it may not be

needed to lower the temperature. Kao did not suggest that not lowering the temperature was universal, especially when the film deposition temperature prior to cleaning step was higher. Kao did acknowledge that at least in prior art lowering the temperature to avoid over etching was known and accepted. Secondly, Frankel et al disclose the Film deposition temperature to be 500° C -800° C and preferred cleaning temperature of 550° C -600° C. Therefore if the film deposition were done at 800° C a lowering of temperature for cleaning would be obvious. Absent


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 703 305 3996. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703 308 1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9310 for regular communications and 703 872 9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

RK
November 18, 2002


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700